OBLON, SPIVAK, et al.
DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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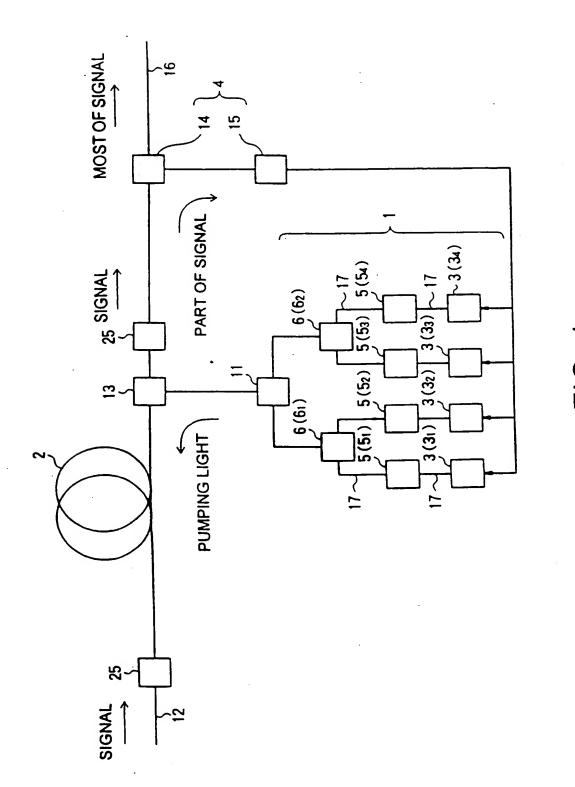


FIG. 1

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 2 of 66

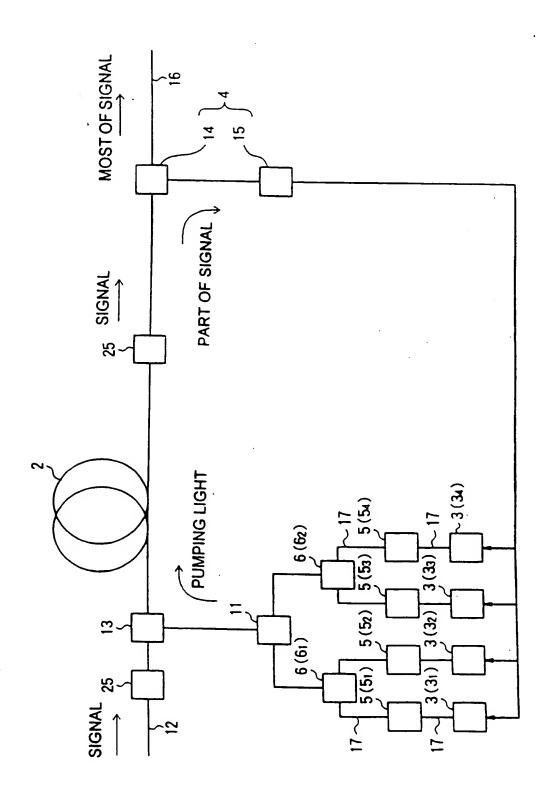
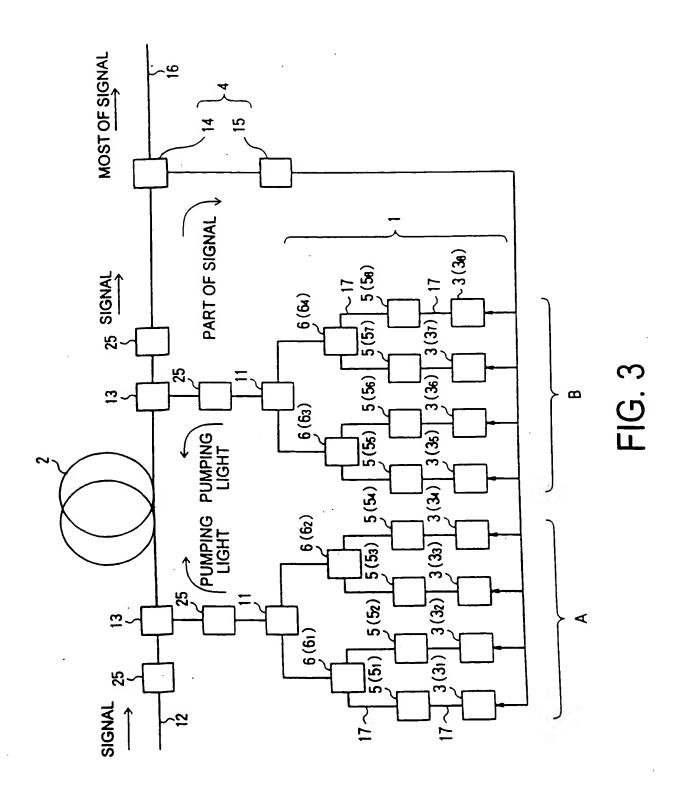


FIG. 2

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OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 4 of 66

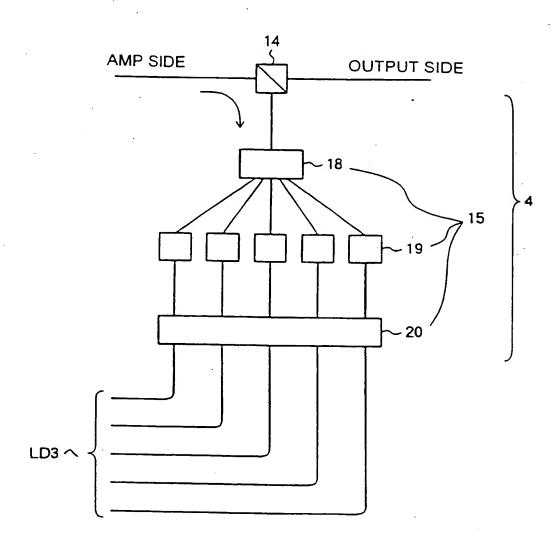


FIG. 4

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 5 of 66

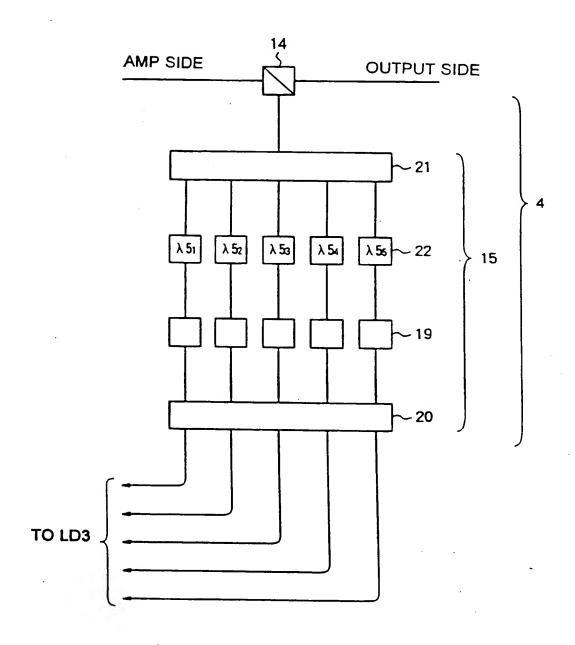


FIG. 5

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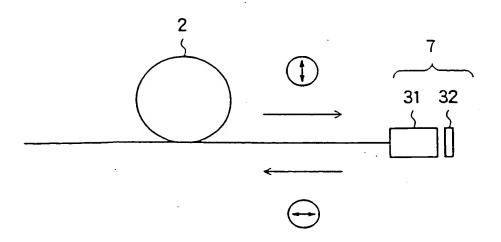
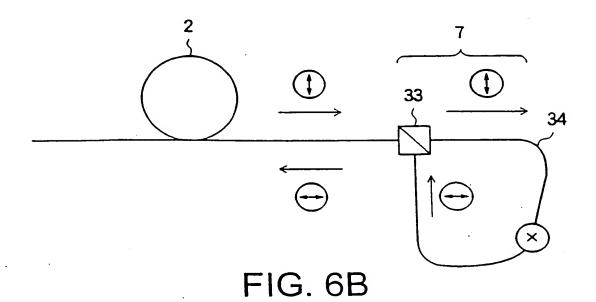


FIG. 6A



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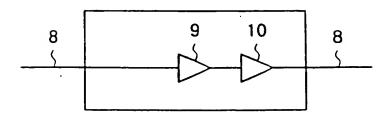


FIG. 7

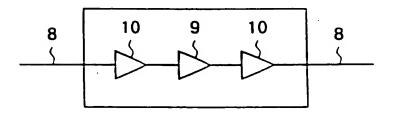


FIG. 8

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 8 of 66

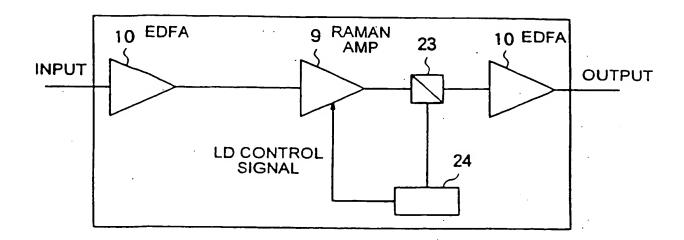


FIG. 9

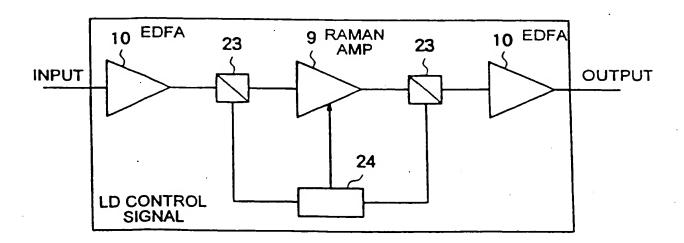


FIG. 10

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 9 of 66

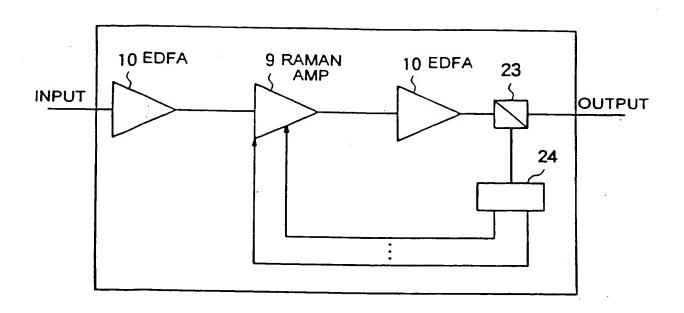


FIG. 11

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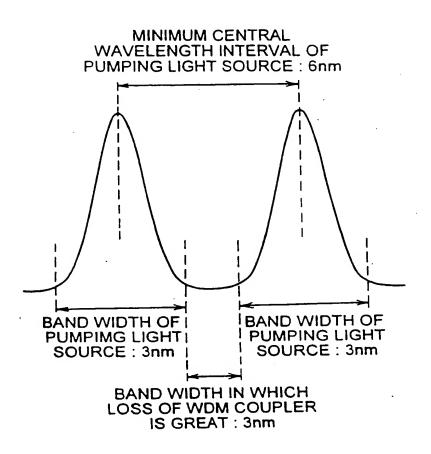
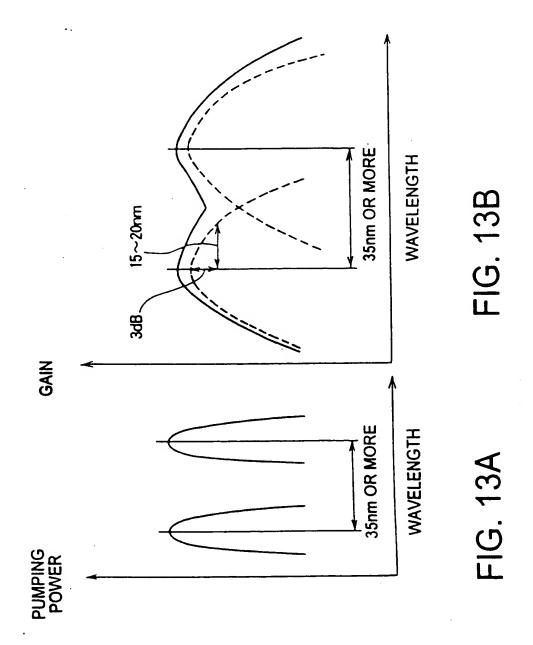
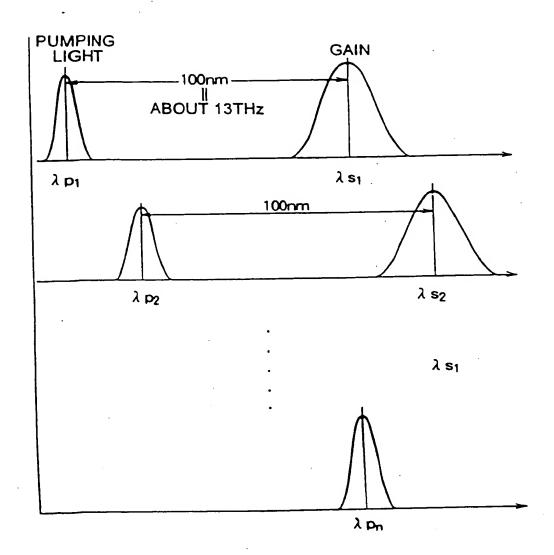


FIG. 12

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IN ORDER NOT TO OVERLAP $\lambda p_n < \lambda s_1$ $\downarrow \qquad \qquad \downarrow \qquad \qquad \downarrow \qquad \qquad \qquad \lambda p_n - \lambda p_1 < 100 \text{nm}$

FIG. 14

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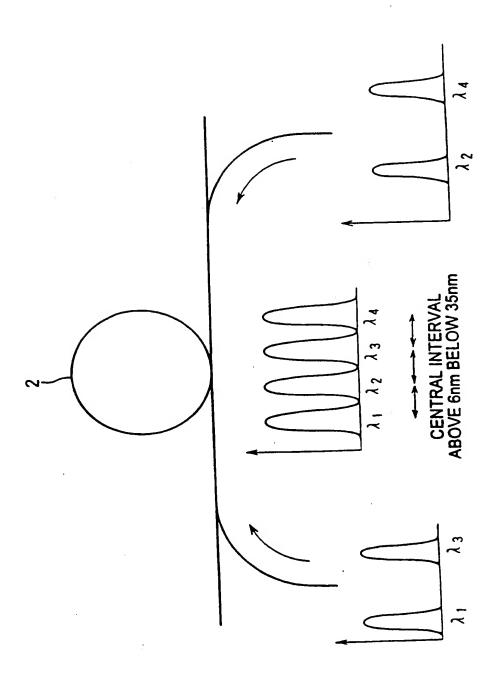
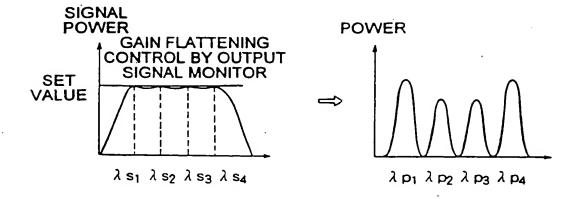


FIG. 15

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$$\lambda s_1 = \lambda p_1 + 100$$
nm
 $\lambda s_2 = \lambda p_2 + 100$ nm
 $\lambda s_3 = \lambda p_3 + 100$ nm
 $\lambda s_4 = \lambda p_4 + 100$ nm

FIG. 16

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REPEATER SPECIFICATION	1	2	3
REPEATER INPUT Pin [dBm/ch]	- 20 ± 3	-15±2	- 15 ± 1
REPEATER OUTPUT Pout [dBm/ch]	10	10	5
DCF LOSS Ld [dB]	10±2	8±1.5	6±1

FIG. 17A

EDFA DESIGN EXAMP	LE	·	1	2	3
AMPLIFIER 1 GAIN	G ₁	[dB]	20±3	15±2	15±1
AMPLIFIER 2 GAIN	G ₂	[dB]	20 ± 2	18±1.5	11±1
REPEATER GAIN	G_{r}	[dB]	30±3	25 ± 2	20±1

FIG. 17B

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INVENTOR:
Youichi AKASAKA, et al.
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RELATIONSHIP BETWEEN FLUCTUATION IN GAIN OF EDFA AND DETERIORATION OF FLATNESS

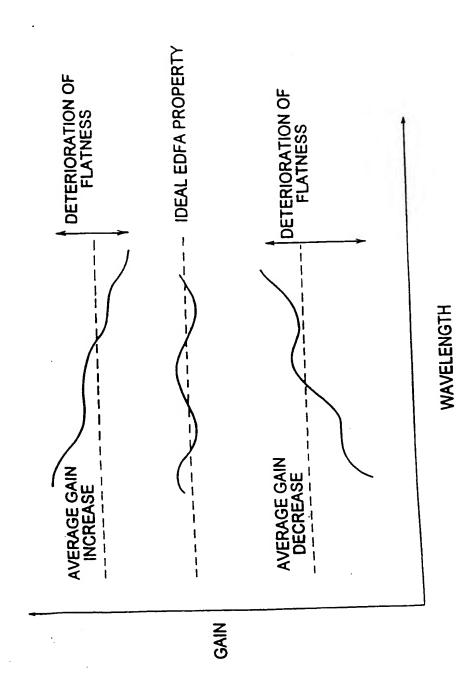


FIG. 18

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DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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COMPENSATION FOR INPUT LEVEL FLUCTUATION DUE TO VARIABLE ATTENUATOR

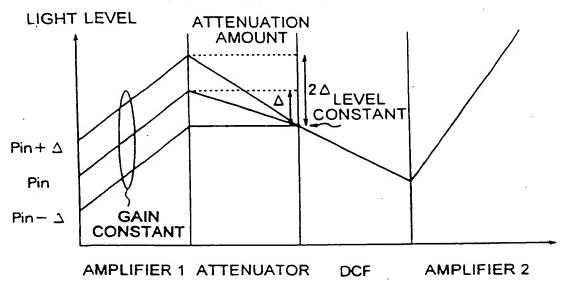


FIG. 19A

COMPENSATION FOR FLUCTUATION IN LOSS OF DCF DUE TO VARIABLE ATTENUATOR

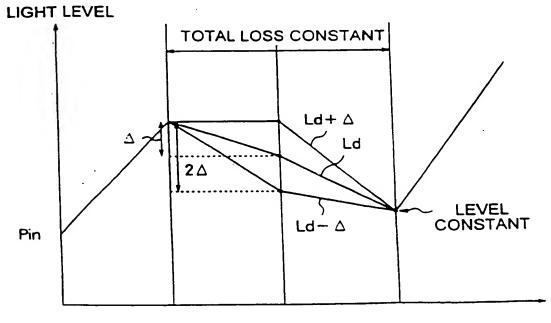


FIG. 19B

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 18 of 66

SPECIFICATION	①	2	3
REPEATER INPUT	- 20 ± 3	-15±2	-15±1
REPEATER OUTPUT	+10	+10	+ 5
DCF LOSS	10±2	8±1.5	6.5±1

FIG. 20A

AMPLIFIER 1	13	13	13
AMPLIFIER 2	10	10	10
RAMAN GAIN	17±5	10±3.5	3 ± 2
REPEATER GAIN	30±3	25±2	20±1

FIG. 20B

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COMPENSATION FOR INPUT LEVEL FLUCTUATION DUE TO RAMAN AMPLIFYING EFFECT

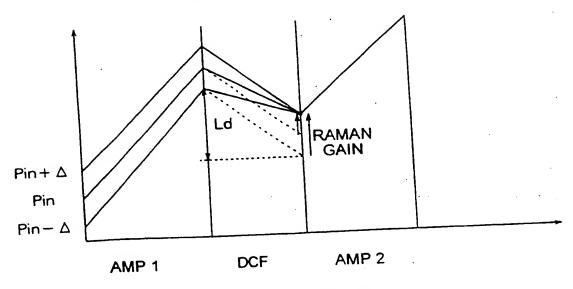


FIG. 21A

COMPENSATION FOR FLUCTUATION IN LOSS OF DCF DUE TO RAMAN AMPLIFYING EFFECT

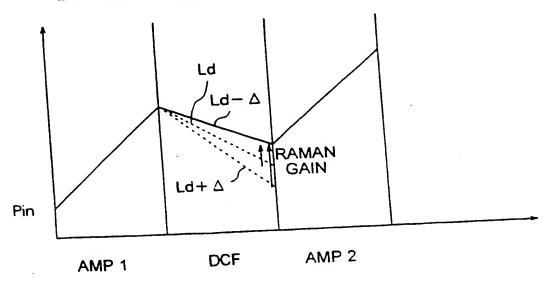
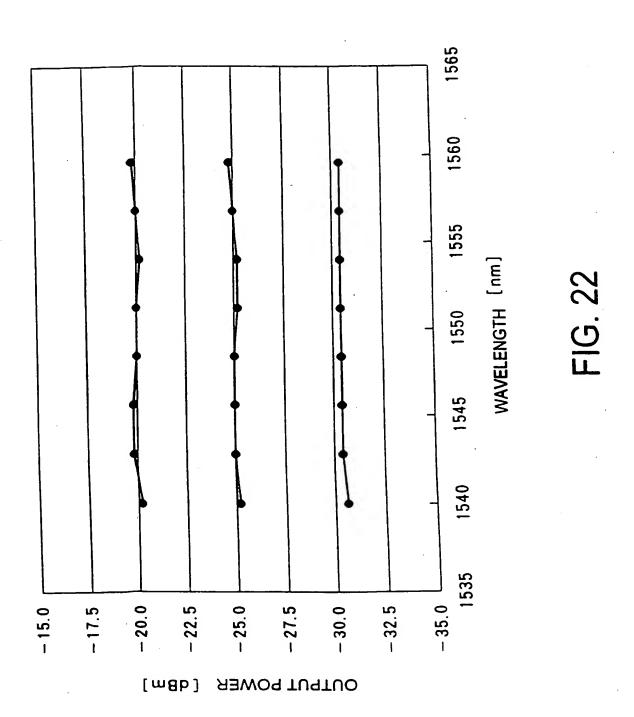
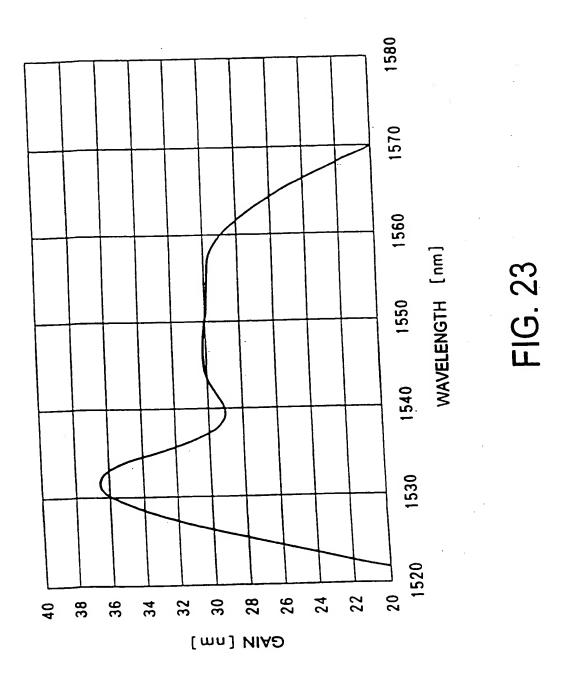


FIG. 21B

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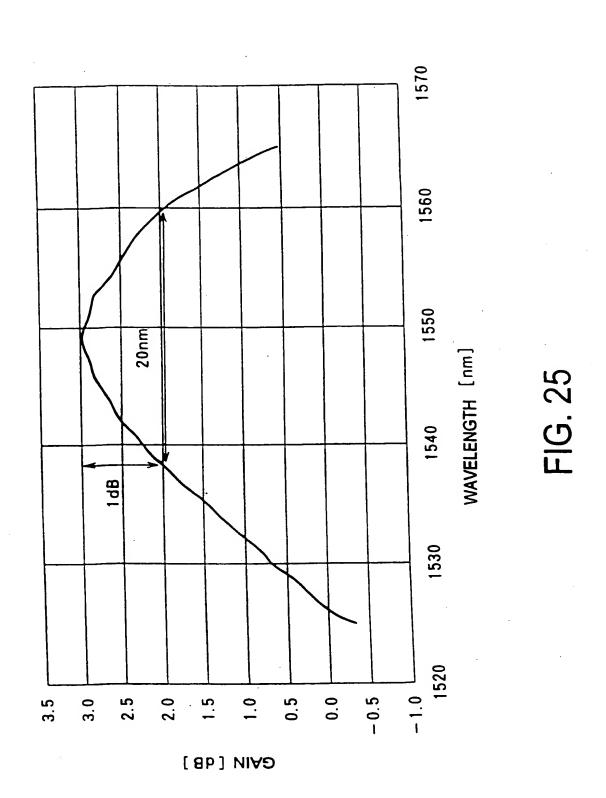
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 21 of 66



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DOCKET NO: 250980US8DIV
INVENTOR:
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SHEET 22 of 66 AVERAGE GAIN WAVELENGTH

FIG. 24

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INVENTOR:

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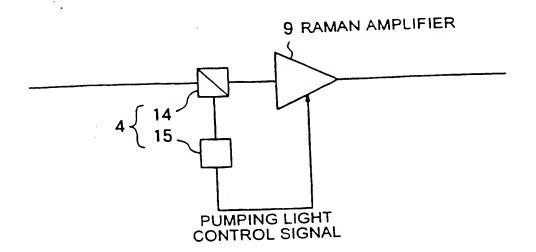


FIG. 26

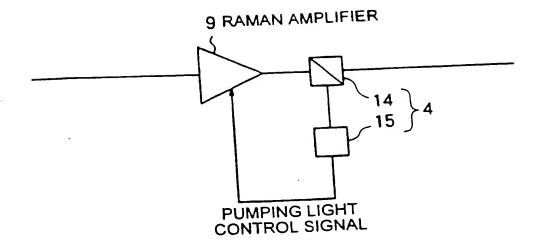


FIG. 27

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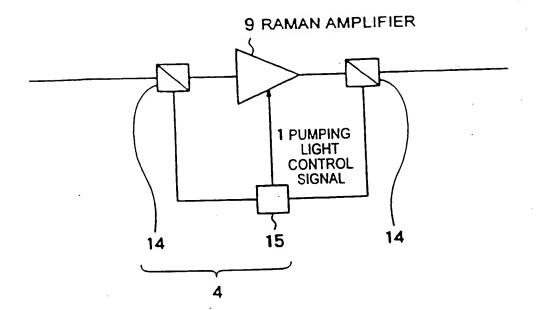


FIG. 28

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 26 of 66

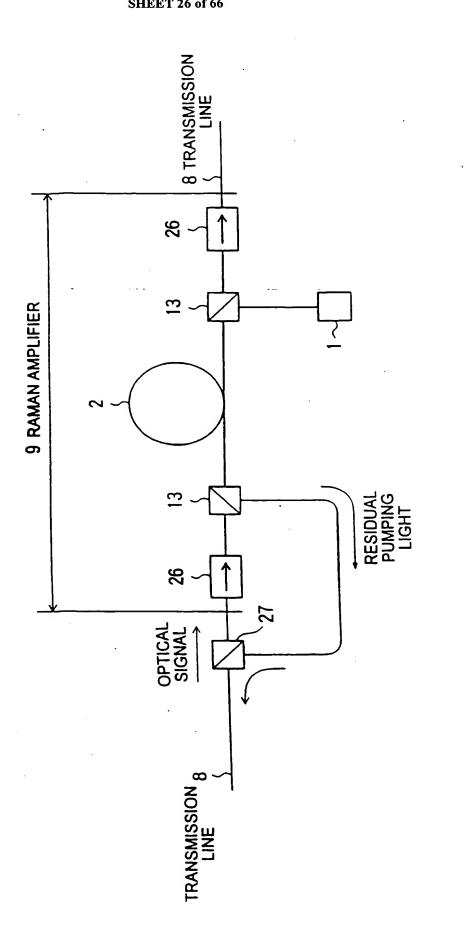
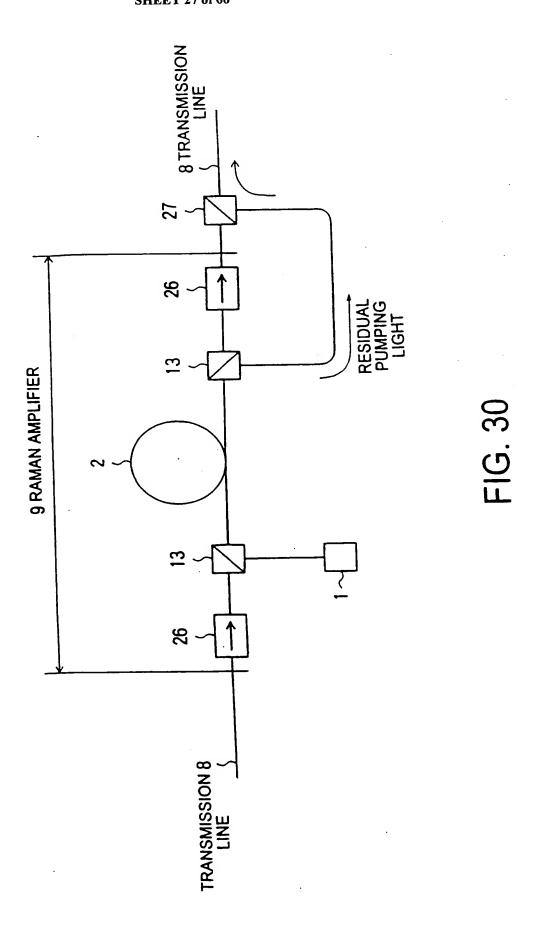
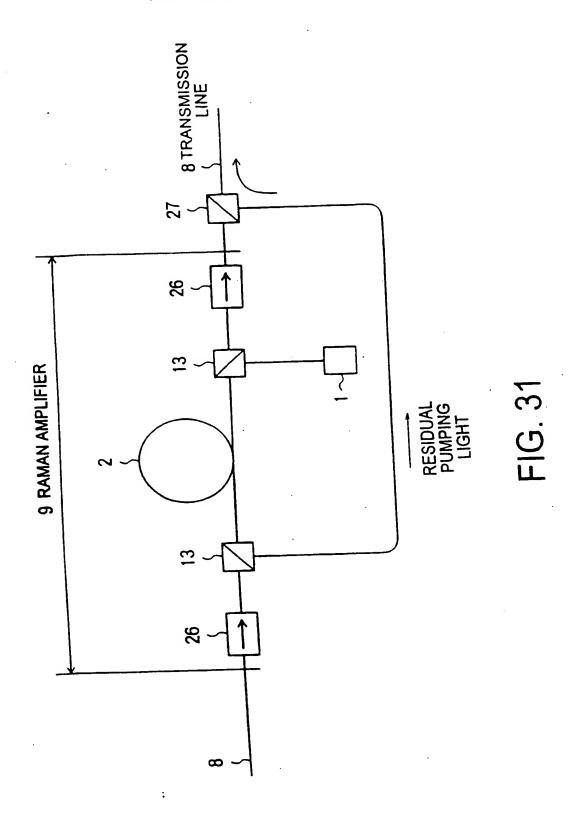


FIG. 29

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OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 29 of 66

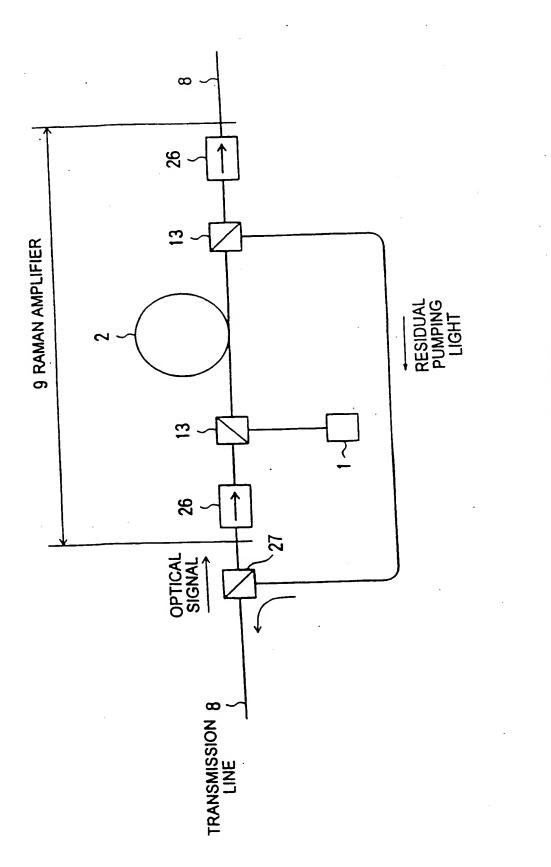


FIG. 32

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DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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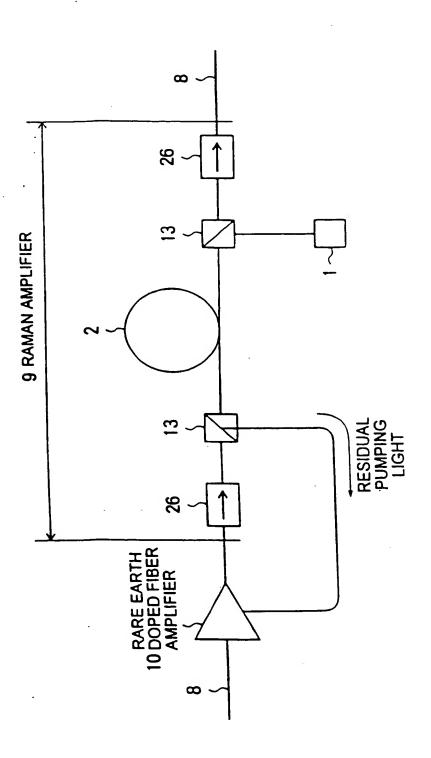
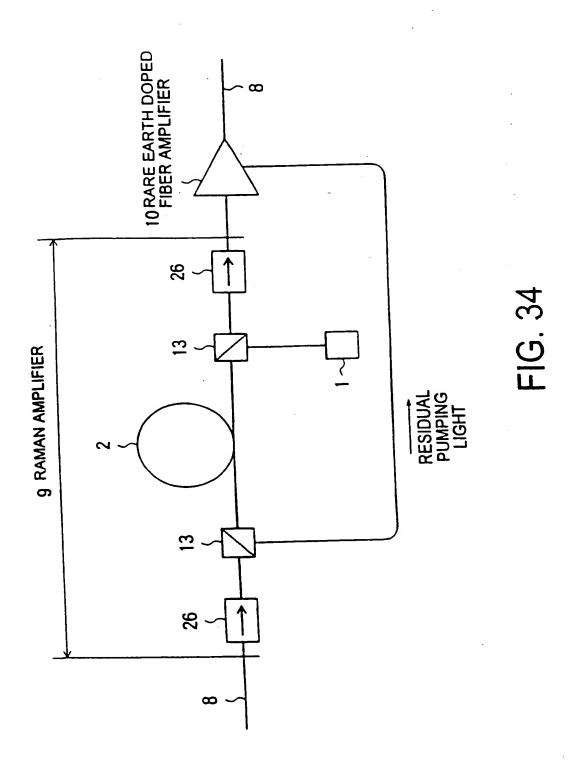
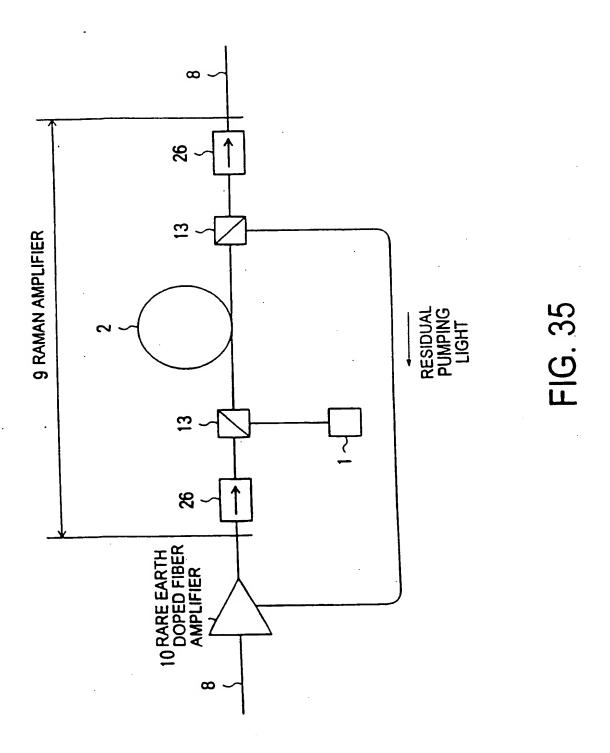


FIG. 33

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DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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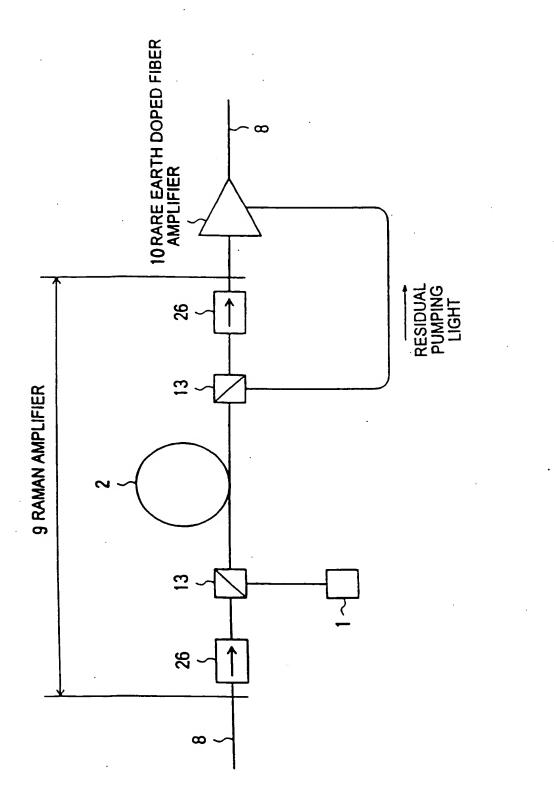
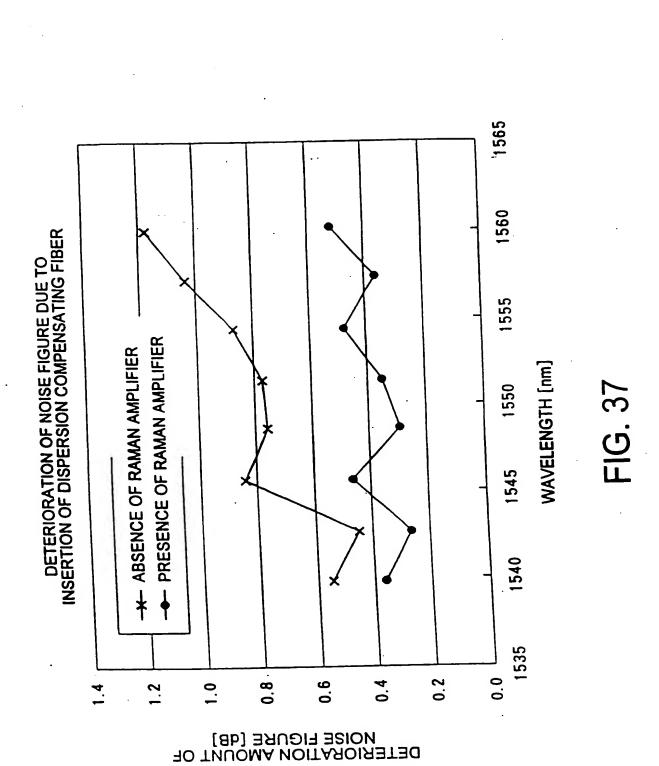


FIG. 36

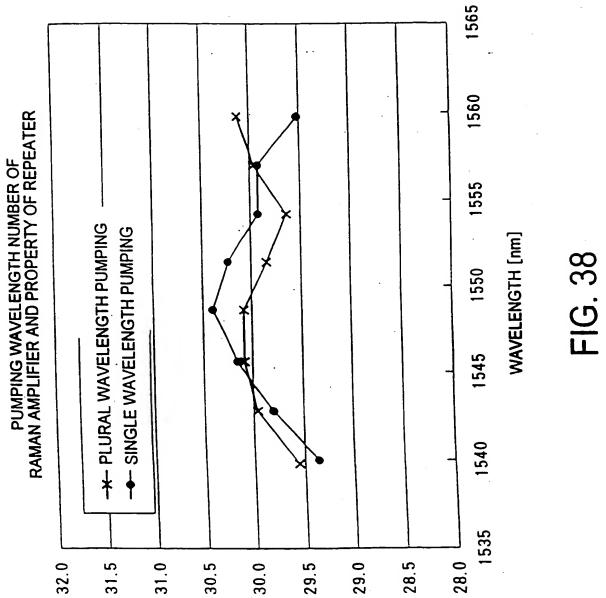


OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV

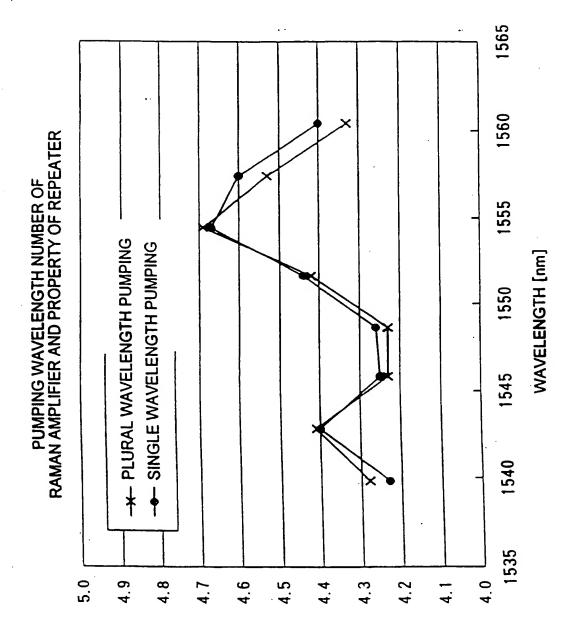
Youichi AKASAKA, et al. SHEET 34 of 66

INVENTOR:

OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 35 of 66



REPEATER GAIN [48]



NOISE FIGURE OF REPEATER [48]

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DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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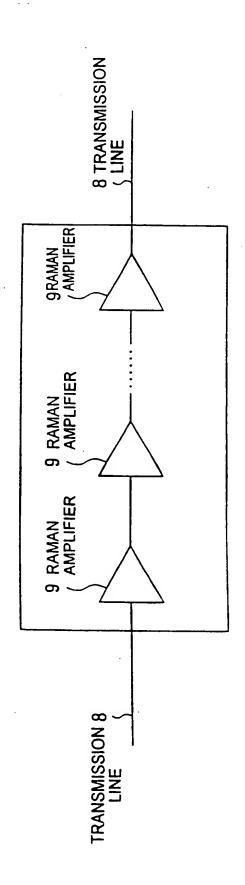


FIG. 40

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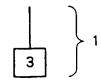


FIG. 41

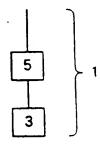


FIG. 42

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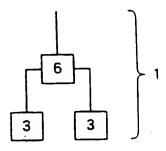


FIG. 43

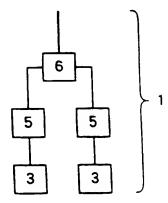


FIG. 44

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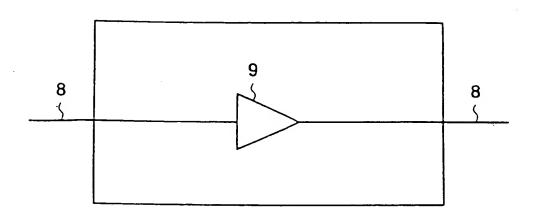


FIG. 45

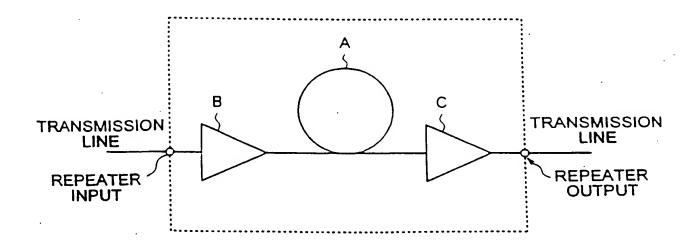


FIG. 46 PRIOR ART

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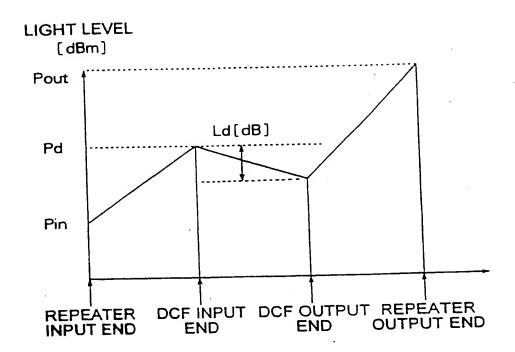


FIG. 47

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INVENTOR:
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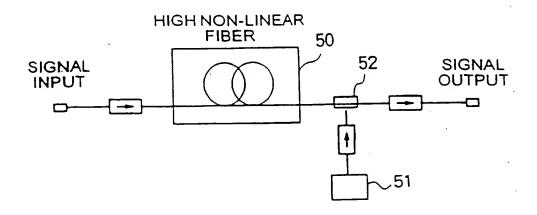


FIG. 49

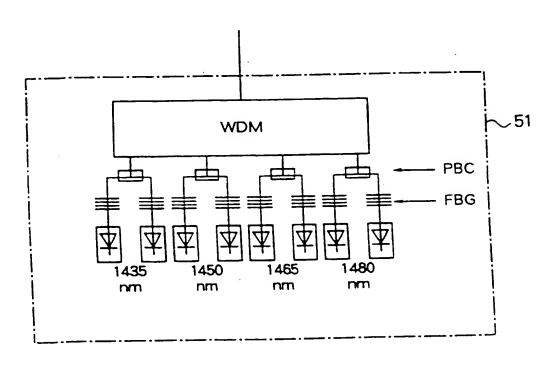


FIG. 50

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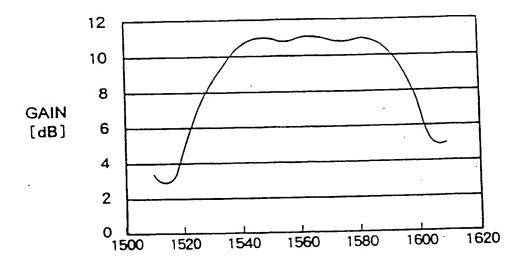


FIG. 51

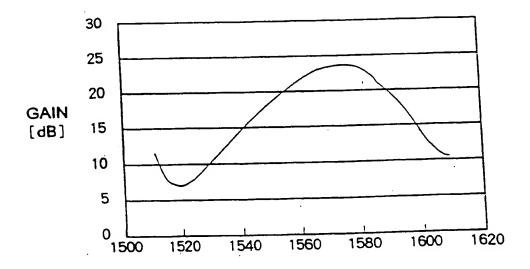


FIG. 52

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INVENTOR: Youichi AKASAKA, et al. SHEET 45 of 66

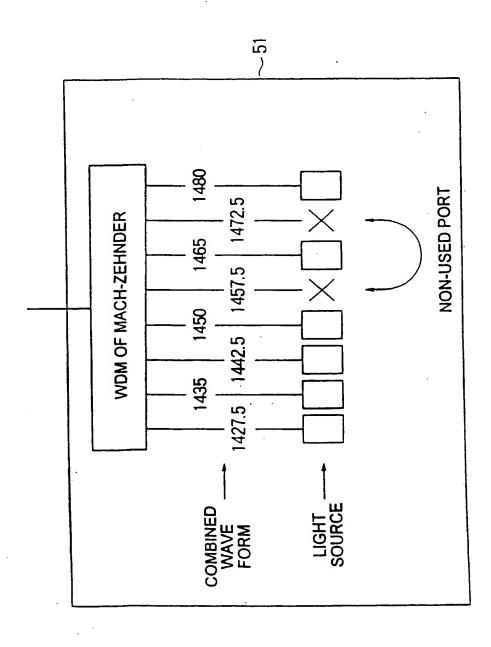
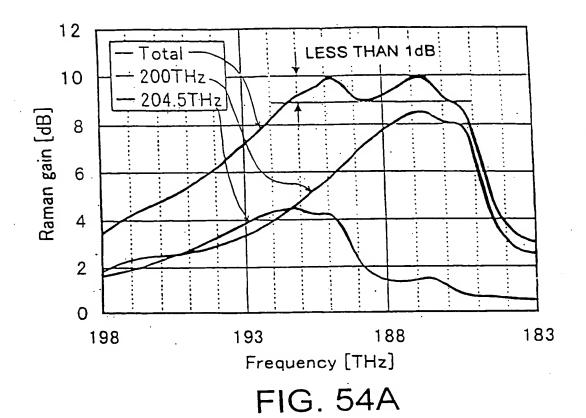


FIG. 53

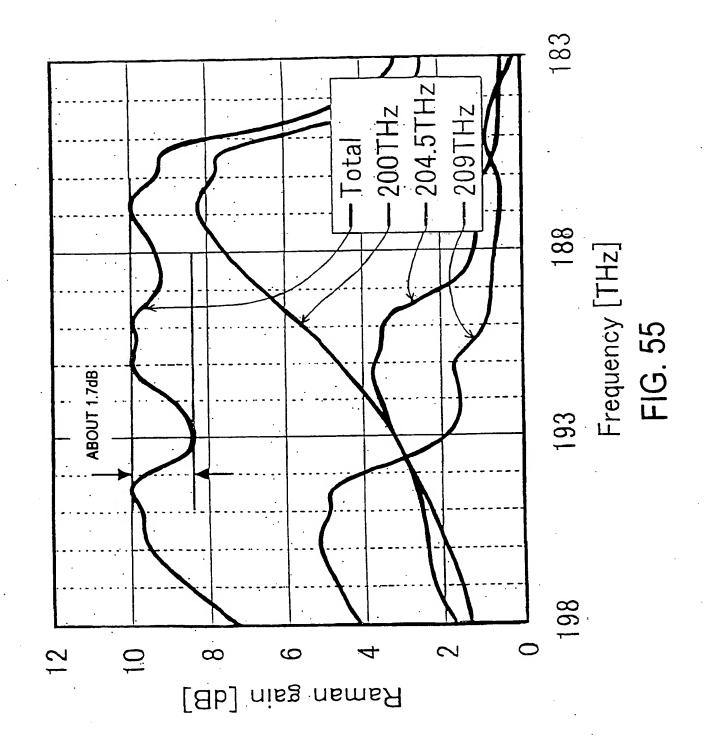
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 46 of 66



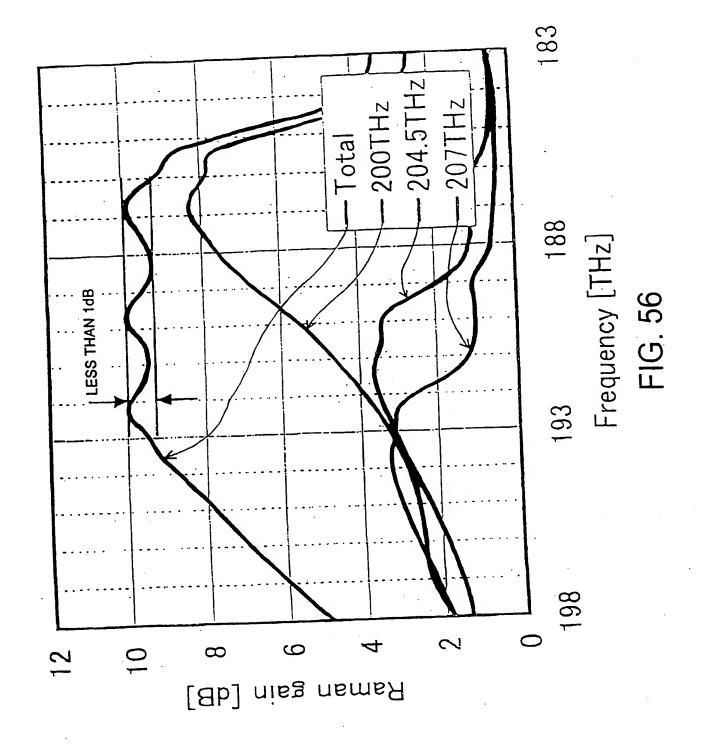
12 ABOUT 1.5dB Total 200THz 10 205THz Raman gain [dB] 8 6 4 2 0 183 198 193 188 Frequency [THz]

FIG. 54B

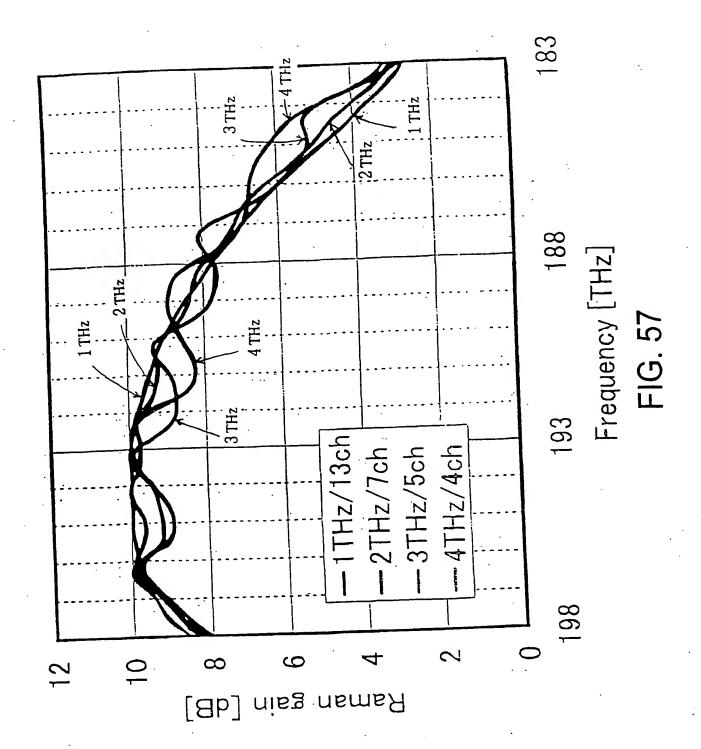
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 47 of 66



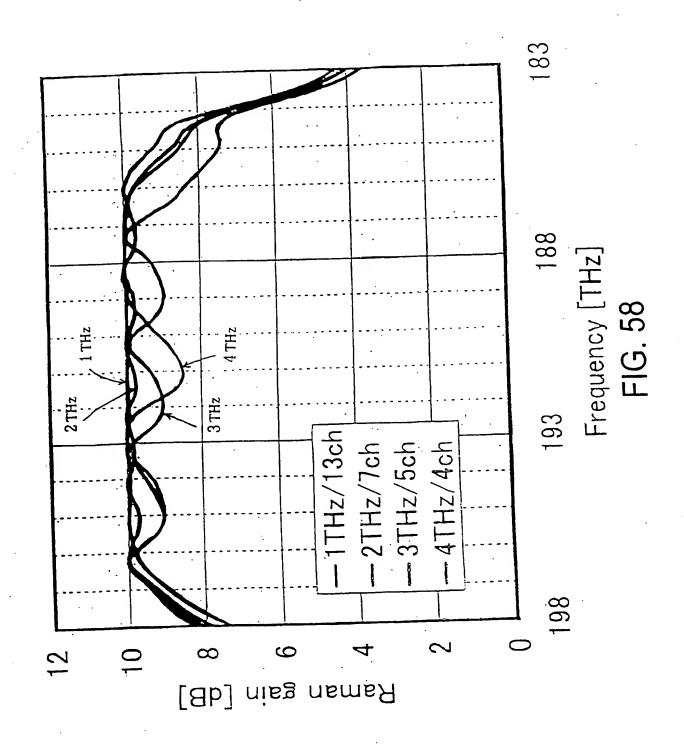
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 48 of 66



OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 49 of 66

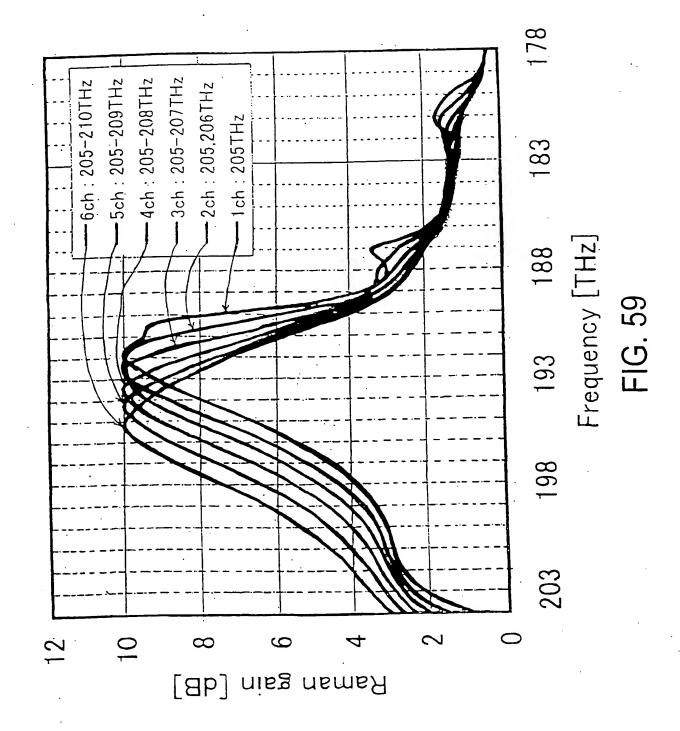


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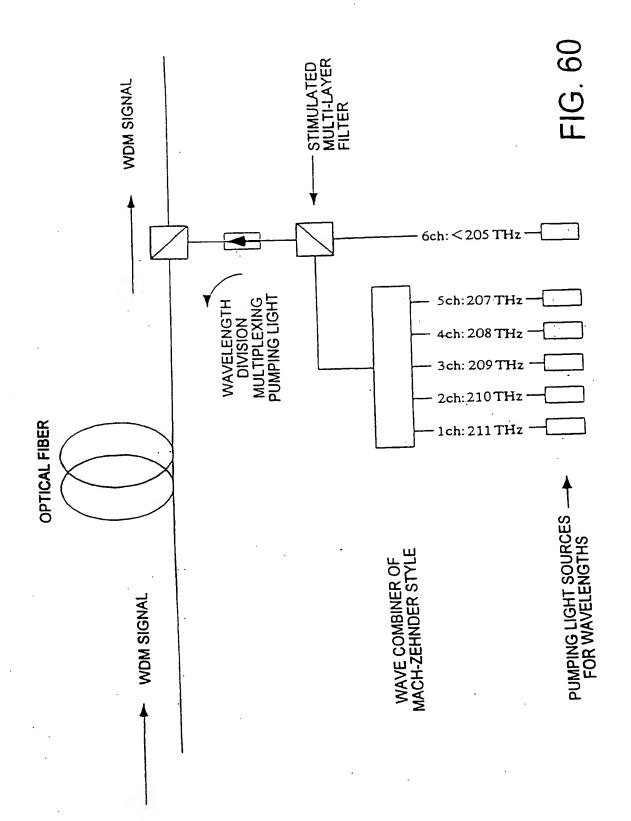


OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al.

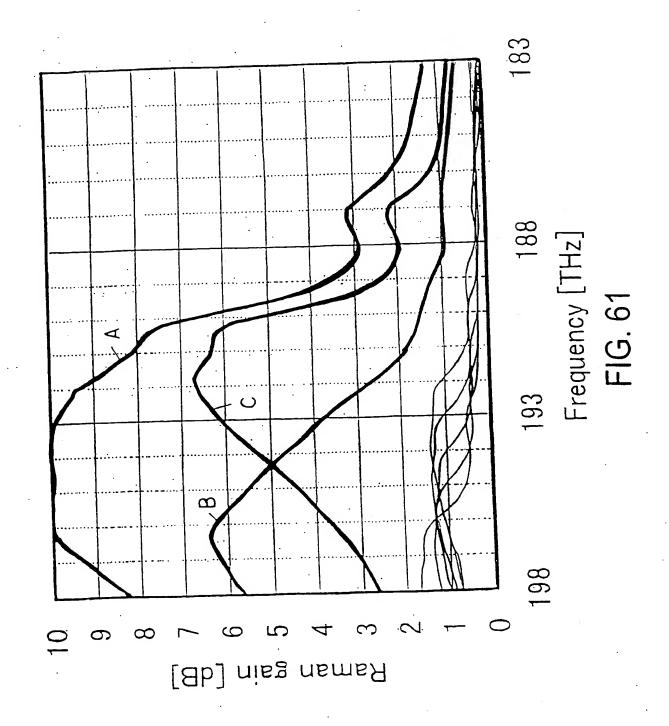
SHEET 51 of 66



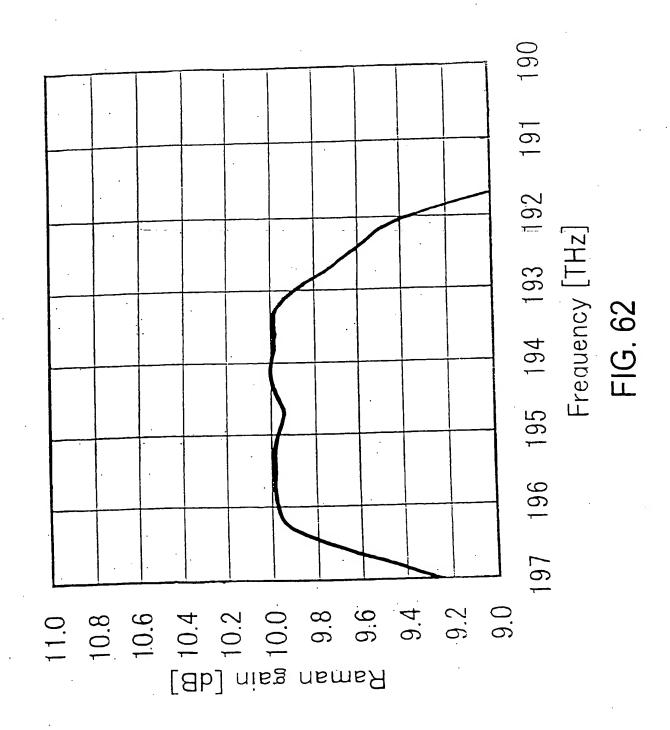
OBLON, SPIVAK, et al.
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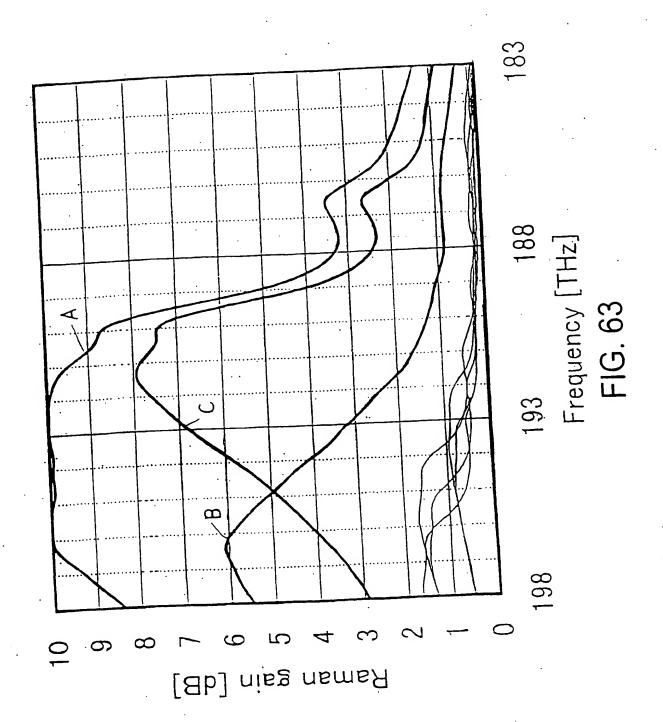
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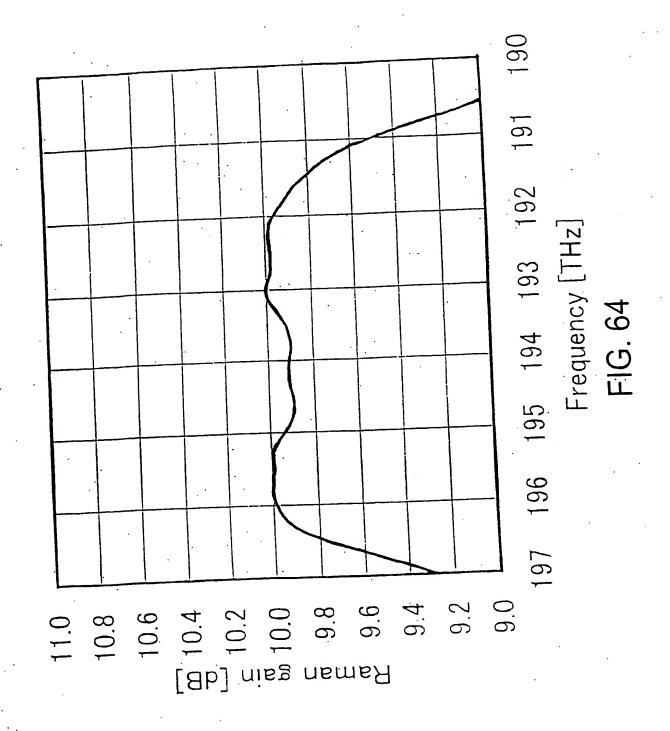
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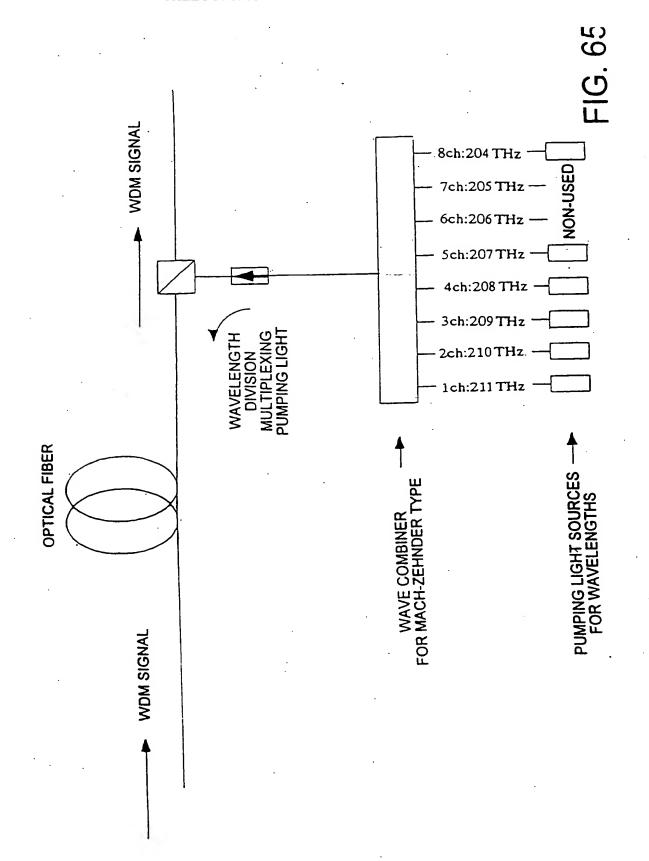
OBLON, SPIVAK, et al.
DOCKET NO: 250980US8DIV
INVENTOR:
Youichi AKASAKA, et al.
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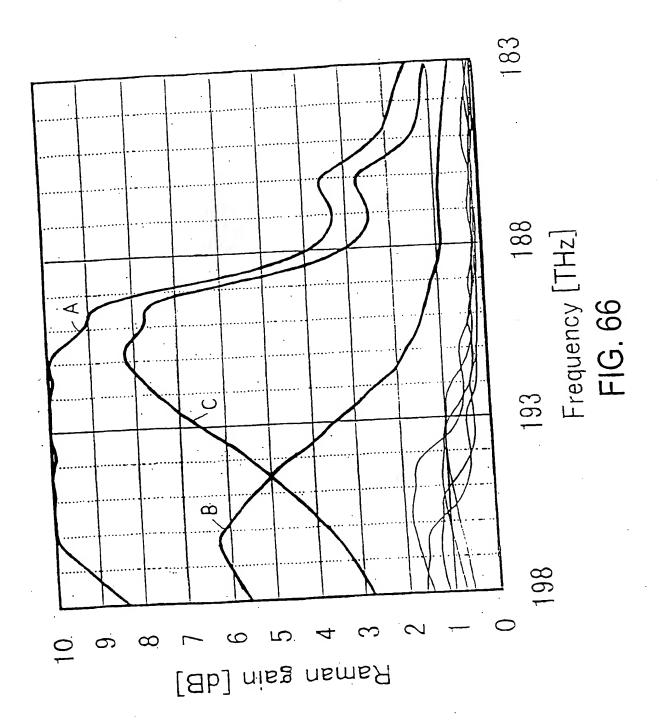
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 56 of 66



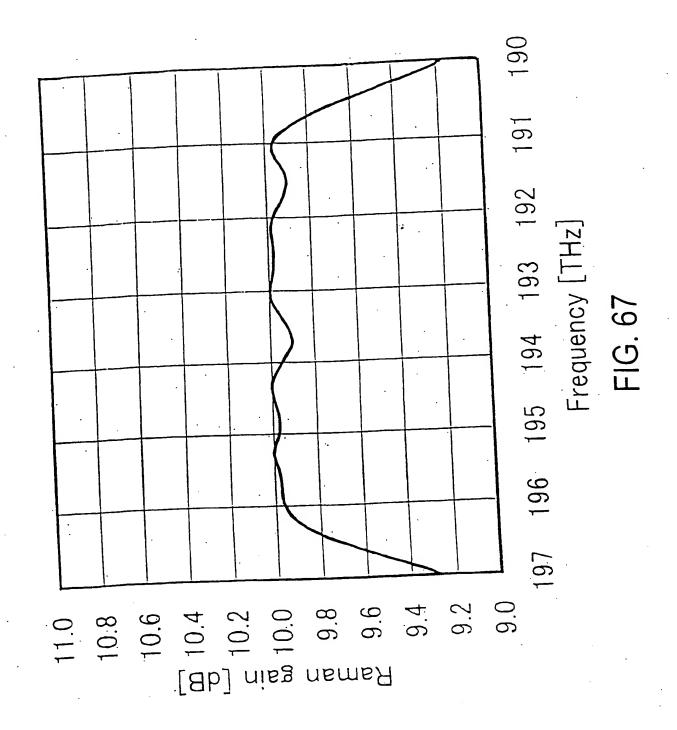
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 57 of 66



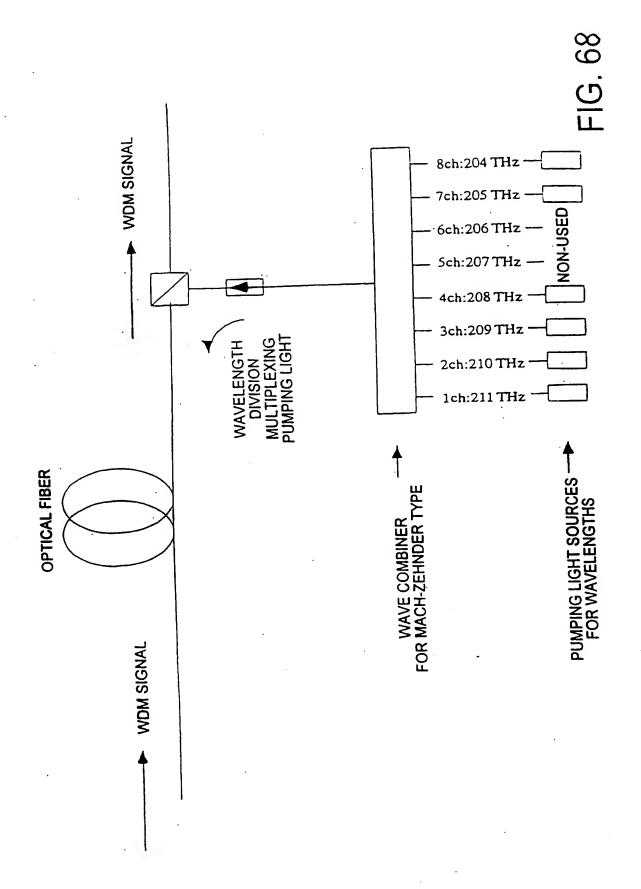
OBLON, SPIVAK, et al. DOCKET NO: 250980US8DIV INVENTOR: Youichi AKASAKA, et al. SHEET 58 of 66



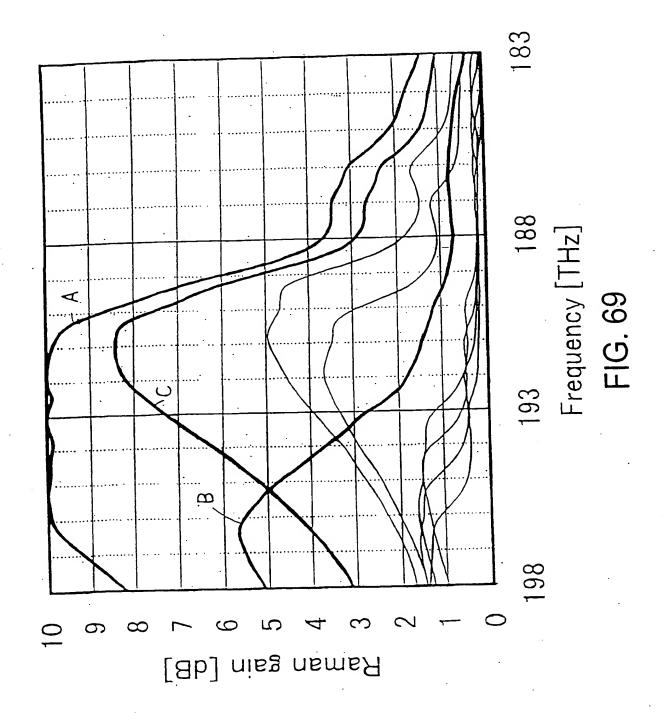
OBLON, SPIVAK, et al.
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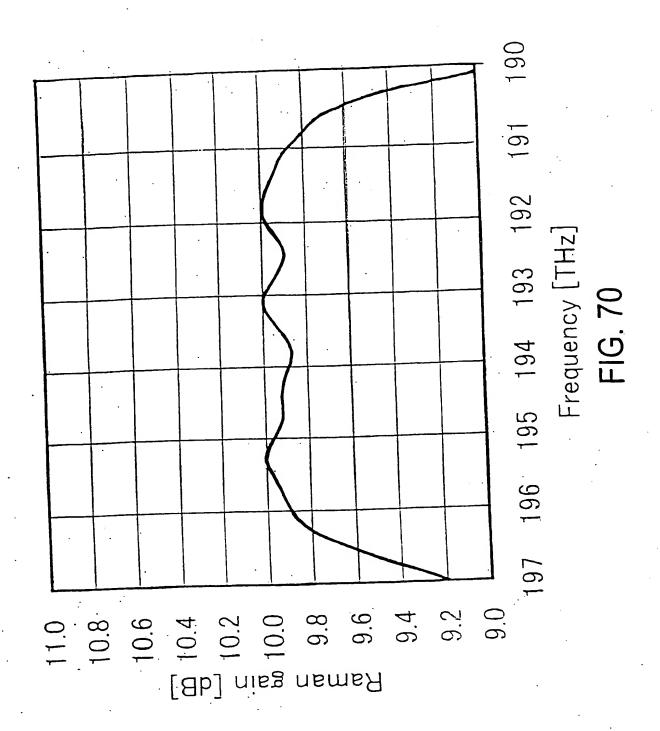


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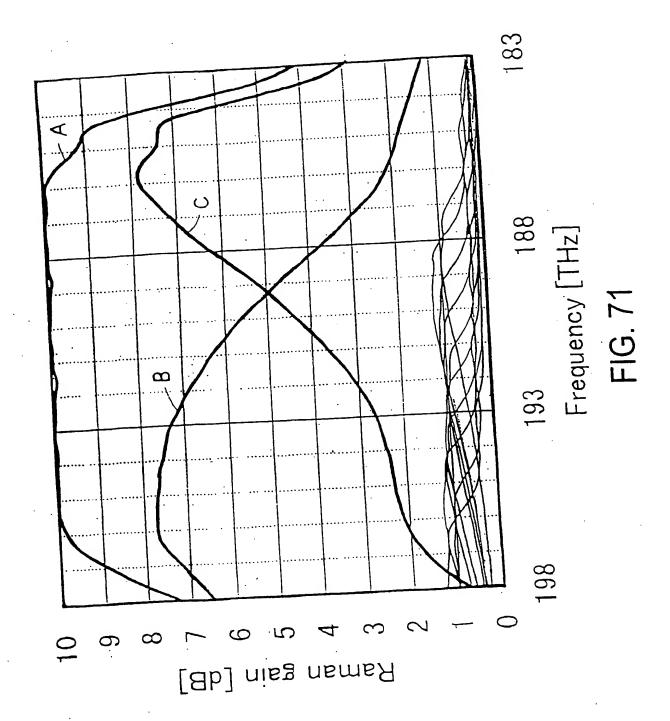


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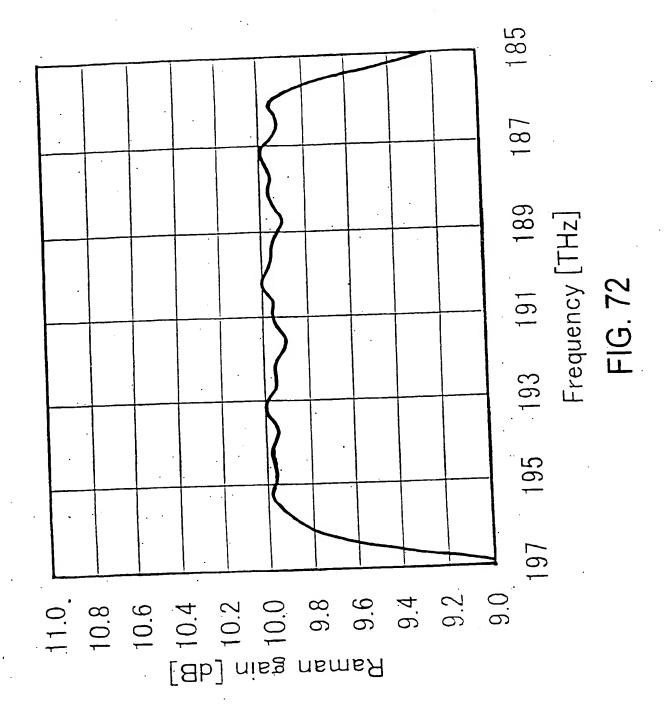


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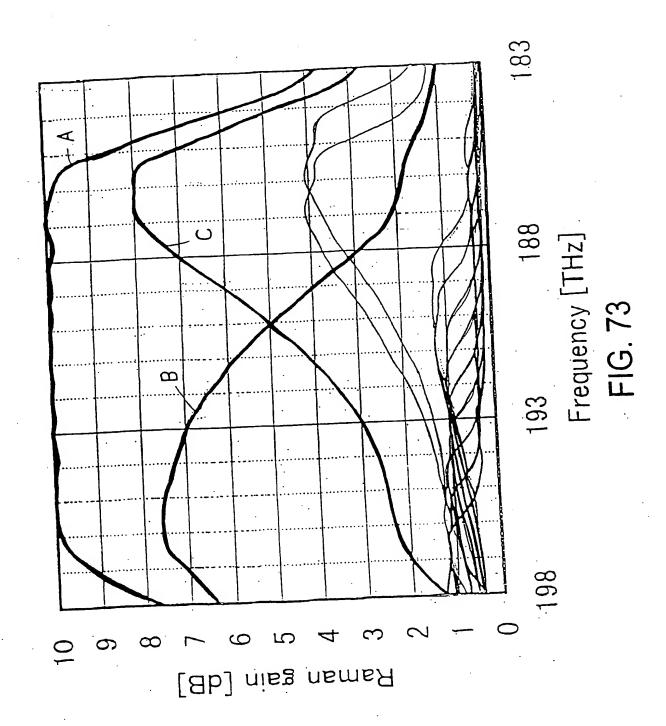


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